

Responses to Questions from the BRAZOS BBASC to the Brazos BBEST

Set One, Received April 5, 2012

1. *Question: The BBASC would like to explore ways to efficiently but also effectively consider the range of gauge locations at which the BBEST has proposed environmental flow regimes. The BBASC would like the BBEST's opinions on the impact to the BBEST's recommendations for meeting a sound ecological environment if the BBASC groups gauges together for the purposes of either: (1) using common analysis or structure to develop environmental flow standard recommendations for each gauge in the grouping; or (2) limiting the number of gauges for which we develop environmental flow standard recommendations. If the answer to either is "yes," could you please provide guidance on an appropriate means to group gauges? If BBEST feels it is appropriate to limit the number of gauges for which it makes recommendations for environmental flow standards, please provide your recommendation of what gauges would be most appropriate to use.*

Answer:

Stations were selected to allow reasonable inferences in flow characteristics and aquatic communities by reach and sub-basins. We used a common approach for hydrograph decomposition (IHA) across stations, so applying a common analysis or structure across stations would be appropriate in some cases. However, we recommend that an environmental flow recommendation should be unique to each station in order to maintain the unique flow character within a reach or sub-basin.

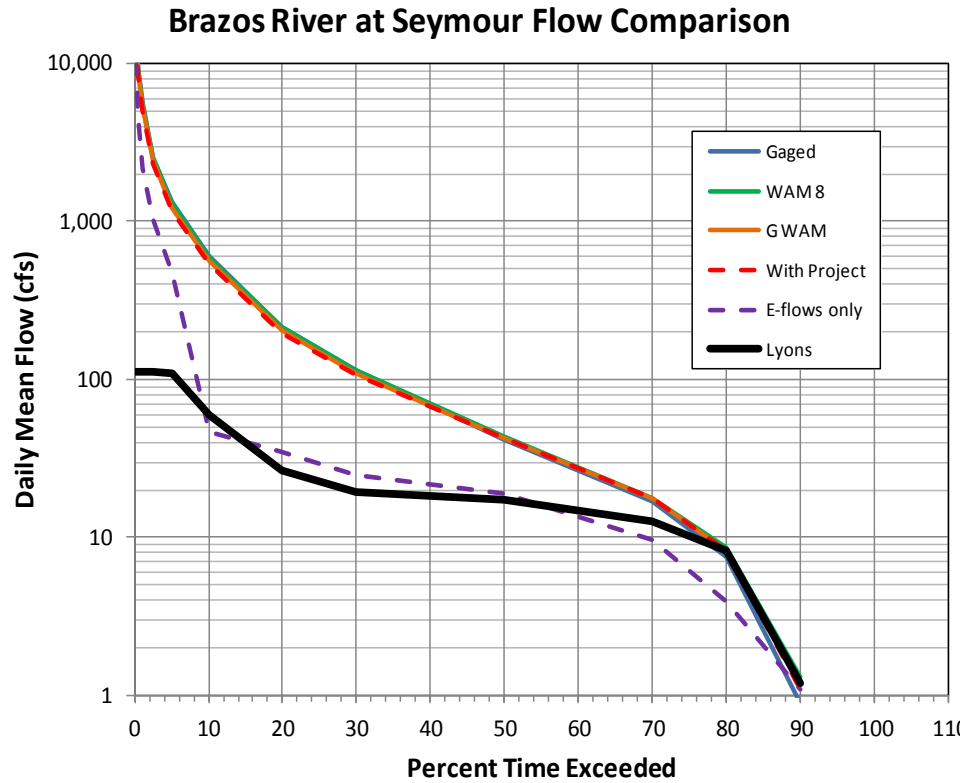
The BBEST does not recommend reducing the number of stations. We had the option to select up to 70 stations within the basin but concluded that 20 stations were appropriate for inferences and recommendations. Most reaches/sub-basins have only one station. In one reach (lower Brazos River), we selected four stations but this was necessary to adequately capture the longitudinal variation in stream flow along the course of the Brazos River main stem.

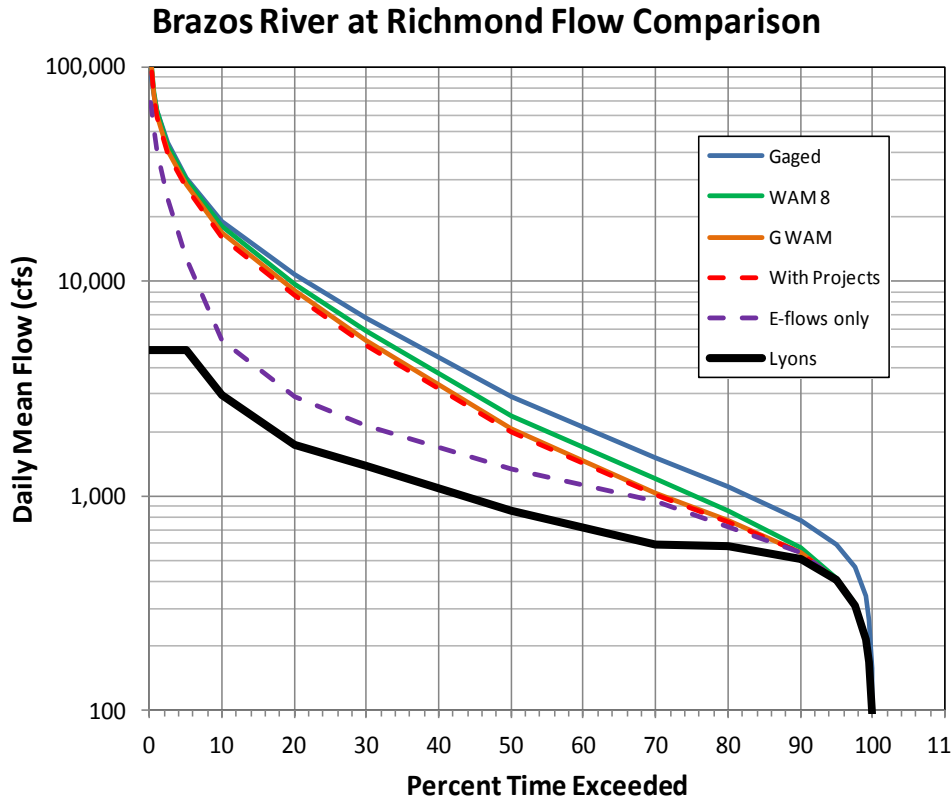
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2. *Question: Could the BBEST prepare a flow duration curve using the Lyons method at the two gauges for which it already has prepared such a curve using the BBEST e-flows? We understand that TCEQ can run Lyons numbers for all BBEST gauges, and that TWDB may be able to assist with the analysis for the two gauges if that would be useful.*

Answer: We have computed flow duration curves based on the Lyons method at the Seymour and Richmond gages for the 1940 – 1997 period of record. We extracted the monthly regulated flows from the Brazos G WAM (2060 conditions), which was the scenario used in the BBEST evaluation. Those monthly regulated flows, which assumed only existing water rights, were disaggregated to daily flows using the same procedure as used in the original BBEST analysis. The resulting curves are shown below on Figures 7.7 and 7.8 from the BBEST report.

The Lyons curves should be compared to the “purple line” flow duration curves, e.g., the curves assuming that only the flow recommendations remain in the stream, or “e-flows only”. At Seymour, at lower flow rates, the Lyons method will increase flows over the e-flows only scenario, but will not provide high flows or high flow pulses. At Richmond, the Lyons method will result in less flow than the e-flows only, with the two becoming comparable in frequency and magnitude in the lowest 10 percent of flows.





3. Question: *The BBASC would like to better understand the following sentence in the BBEST executive summary (page iv, last paragraph):
 “If considered as the only water passing through the stream reach, the environmental flows proposed in this report are likely to be inadequate for long-term maintenance of a sound ecosystem in many cases, the lower river reaches and estuaries in particular.”*

Answer: This statement is perhaps best understood by referring to Figure 7.7 and 7.8 in Section 7 of the report, which can be see in our response to the previous question. The purple lines on these figures represent the flows that would be left at the Seymour and Richmond gages if all flows except the environmental flows specifically set aside by the Environmental Flow Regime Recommendations in the report were to be diverted. The sentence indicates that if these were the only flows in the stream, they might not be sufficient for long-term maintenance of a sound ecosystem in many cases. In setting the recommendations, the BBEST considered that there are no projects planned or contemplated that would divert all flows except the environmental flows specifically set aside by the Environmental Flow Regime Recommendations.

4. Question: *Possible additional information and model runs: BBASC would be interested in the BBEST thoughts about what types of information might be most useful for the BBASC to consider (either from the BBEST, the agencies or other experts) if there is time and money to seek additional analyses.*

Answer: We would recommend that the BBASC might consider the following:

- (1) The impact of the Environmental Flow Regime Recommendations on the yield of proposed projects, especially those recommended in regional water plans.
- (2) The impact of the Environmental Flow Regime Recommendations on flows at locations other than those modeled by the BBEST.
- (3) The impact on flows and project yields of alternative Environmental Flow Regimes that may be considered by the BBASC.